

## EUROSTER 11W CENTRAL HEATING SYSTEM CONTROLLER



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### 1 INTRODUCTION

Carefully study this user manual to learn how to correctly operate the EUROSTER 11W central heating system controller.

### 2 FIELD OF APPLICATION

**EUROSTER 11W** is a modern microprocessor-based controller used to control central heating (CH) systems with coal/culm-fired blow boilers.

The controller measures the boiler water temperature and depending on its relation to the preset temperature respectively adjusts flow of the air supplied to the boiler furnace and turns ON/OFF the CH system circulation pump.

The **EUROSTER 11W** controller features the ANTY STOP function that prevents idle pump rotors against seizing. Once the heating season is over, every 14 days the function automatically turns ON the pumps for 30 seconds. To that end the controller must be left powered up.



### 3 VISIBLE CONTROLLER ELEMENTS



1. 230 VAC~ mains input
2. 230 VAC~ power supply to pump
3. 230 VAC~ power supply to fan
4. Input for temperature sensor cable
5. Mains switch
6. LCD display
7. Knob

### 4 INSTALLATION



**Hazardous voltages may be present inside the controller and on its cables. Therefore it is expressly forbidden to install the device prior to disconnecting its mains power supply. Only qualified technicians may install the controller. Do not install any devices showing signs of any mechanical damage.**

The procedure:


**a) Mount the controller:**

- using a pair of supplied nylon nail-it fasteners (anchors) mount the controller box on a wall (or any other suitable supporting structure)
- using fasteners fix controller cables to the wall.


**b) Install temperature sensors:**

- **do not immerse sensors in liquids nor install them within stream of flue gases**
- install boiler temperature sensor at the boiler point specially designed for that purpose or else on an unshielded boiler outlet pipe (as close to the boiler as possible)
- using hose clips tighten the sensor to its pipe and cover it with thermal insulation.

**c) Hook up pump power supply cable:**

- connect yellow (or yellow-green) PE wire with the  terminal
- connect blue wire with the N terminal
- connect brown wire with the L terminal.

**d) Hook up fan power supply cable:**

- connect yellow (or yellow-green) PE wire with the  terminal
- connect blue wire with the N terminal
- connect brown wire with the L terminal.

**e) Verify the connections:**

- check up all cable connections and tighten terminal box lids.

**f) Hook up the controller:**

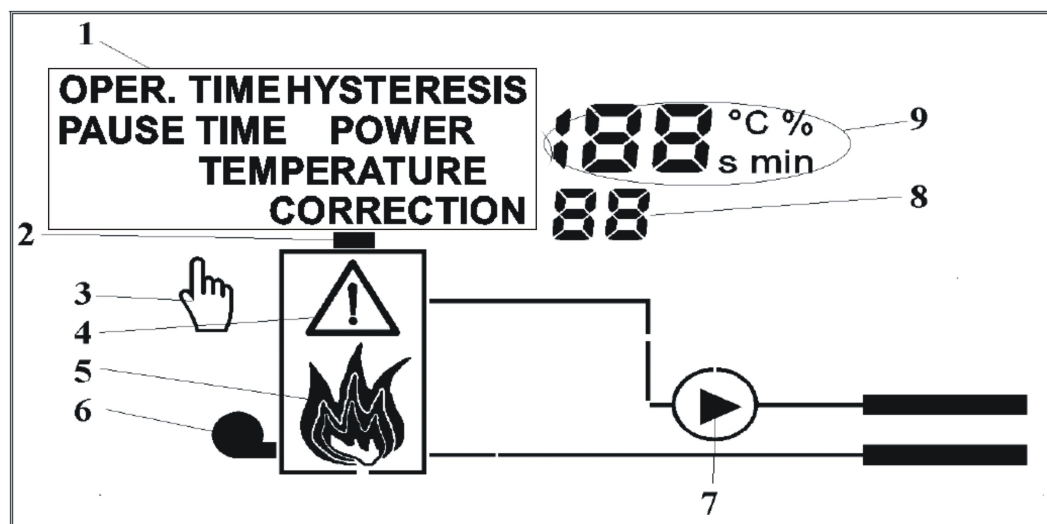
- **make sure controller cables are protected against incidental cut off**
- plug the controller power supply cable into a 230V/50Hz mains socket equipped with a grounding pin.



**The controller must not be installed in a place where the ambient temperature may exceed 40°C.**

## 5 CONTROLLER DISPLAY

Elements of the controller display:



1. Name of the controlled parameter (displayed while set point values are browsed/set)
2. Boiler temperature sensor icon
3. Manual operation mode (icon lit while the temperature is manually controlled)
4. Alarm (icon blinks in case of an alarm)
5. State of the heat source (boiler) furnace – animated icon, see description below
6. Fan icon lit while the fan is running
7. CH system pump icon lit while the pump is running

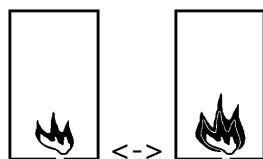
8. Menu option number (displayed while set point values are browsed/set)
9. Boiler temperature / other displayed parameter value

### Animated icon that visually presents state of the boiler furnace.

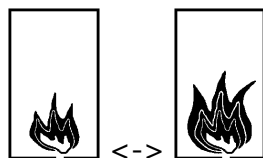
- Firing up – the boiler has not yet reached its preset temperature:



- Normal operation – boiler temperature within hysteresis corridor around the preset:



- Blowdown – boiler temperature has exceeded the preset by more than half of the hysteresis:



- Overheating – boiler temperature  $>90^{\circ}\text{C}$ :



- Furnace put out – the preset has not been attained in spite of 1 hour of firing the boiler up or boiler furnace temperature has dropped below the put-out temperature (set point Błąd: Nie znaleziono źródła odwołania):



## 6 TURNING THE CONTROLLER ON

- Turn the controller mains switch (5 in section 3) into the "I" position.
  - Device firmware version No. and compilation date are sequentially displayed for 2 s.
  - "AS" letters are blinking on the display while the ANTY STOP function turns on the pump.
  - State of the system is shown on the display.
- If the controller is being turned on for the first time: set the desired controller presets (see section 8 below).

## 7 FACTORY (DEFAULT) PRESETS

Proceed as follows to restore factory presets:

- Press the knob and while holding it depressed turn the controller off and on. "Fd" (factory defaults) is displayed.

- Release the knob. Digit 0 is displayed.
- Select digit 1 and accept the selection.
- Check and correct the presets if needed.

## 8 CONTROLLER PRESETS

Shortly after power supply of the controller is turned on, current state of the system is shown on the display. Turn the knob to the right to enter the preset browse/edit mode. General procedure to edit a preset:

1. Turn the knob to select the desired preset (parameter). The controller displays current value of the selected parameter (top) and its number (bottom).
2. Press the knob. The displayed parameter value starts to blink.
3. Set the desired new value and press the knob to accept it  
or  
Wait 10 seconds until the displayed parameter value stops blinking in order to abort the edit procedure (to leave the current value intact)

Configuration windows are numbered to facilitate manipulations. User may edit the following controller parameters (presets):

### 1. Boiler preset temperature

The controller will attempt to maintain this temperature manipulating boiler fan and CH pump.

### 2. Fan hysteresis

Temperature range, in which controller linearly adjusts fan power. The narrower the preset hysteresis, the smaller fluctuations of the CH system temperature will be. However, a too narrow preset will make the temperature to oscillate – the controller will alternately heat up and cool down the boiler.

Initially set the maximum allowable hysteresis, wait until the preset temperature is reached and check if (in such conditions) the fan operates at a power level between set points Błąd: Nie znaleziono źródła odwołania and Błąd: Nie znaleziono źródła odwołania. If so, the hysteresis may be narrowed down.

### 3. Minimum fan power

The lowest power at which the fan may operate. Should be selected experimentally as the power, at which the fan rotor starts to rotate (see fan test function, set point 11).

### 4. Maximum fan power

The highest power at which the fan should operate. Should be selected experimentally as the power, at which the actual boiler temperature (maintained by the controller) was as close to the preset temperature as possible.

### 5. Blowdown time

The fan is turned ON for that period if the controller needs to blow down the furnace (to remove combustion gases out of the boiler). Blowdown time should be long enough to effectively exhaust the gases via the chimney, but on the other hand short enough to prevent boiler temperature rise.

### 6. Gap between successive blowdowns

Time after the last blowdown cycle before a new cycle may be started. It should be long enough to prevent boiler temperature rise, but on the other hand short enough to avoid explosive combustion of the boiler gases.

### 7. CH pump TURN ON temperature

See section 11 for detailed description of conditions in which CH pump is turned ON/OFF.

### 8. CH pump hysteresis

Difference between the temperature at which the controller turns the pump on and the temperature at which the controller turns it off. See section 11 below for details.

### 9. Boiler temperature sensor correction

A constant added to all values measured by boiler temperature (external) sensor to compensate for differences in respect to water temperature inside the boiler.

### 10. Put out temperature

As soon as actual boiler temperature has dropped below that preset, the controller turns the boiler OFF (the boiler furnace is most probably put out). A too high put out temperature preset

may cause the controller to turn the boiler OFF mistakenly.

### 11. Fan manual operation (test)

Display current fan status commanded by the controller (0...100%). Press the knob and modify the parameter value to manually control the fan. Press the knob once more or leave it inactive for 10 seconds to resume automatic mode of control.

### 12. Pump manual operation (test)

Display current pump status commanded by the controller (0/1 = pump disengaged/engaged).

Press the knob and modify the parameter value to manually control the pump. Press the knob once more or leave it inactive for 10 seconds to resume automatic mode of control.

All controller presets are listed below:

Parameter		Preset value			Unit
No.	Name	default	min	max	
1	Boiler preset temperature	50	40	80	°C
2	Fan hysteresis	6	2	10	°C
3	Minimum fan power	45	30	100	%
4	Maximum fan power	100	30	100	%
5	Blowdown time	10	0	120	s
6	Gap between successive blowdowns	6	0	30	min
7	CH pump TURN ON temperature	40	20	80	°C
8	CH pump hysteresis	4	2	10	°C
9	Boiler temperature sensor correction	0	-5	5	°C
10	Put out temperature	35	30	50	°C
11	Fan manual operation (test)	– <sup>1)</sup>	0 (OFF)	100 (ON)	%
12	Pump manual operation (test)	– <sup>1)</sup>	0 (OFF)	1 (ON)	-

<sup>1)</sup> The controller displays values calculated by its algorithm.

## 9 FIRING UP

During the boiler firing-up phase the pump is disengaged and the fan is operated at its highest power level in order to speed the process up as far as possible.

**The firing up procedure may be initiated exclusively while the controller is in the put-out mode – fan is not operating, no flame icon is visible on the display.**

To initiate the procedure:

- turn the controller knob all the way to the left, then press it and hold down until the fan is started, or
- turn the controller power OFF then ON.

The procedure is terminated when:

- the boiler temperature is closer to the preset (Błąd: Nie znaleziono źródła odwołania) than half of the hysteresis (Błąd: Nie znaleziono źródła odwołania), or
- within 1 hour the boiler has not reached the preset put-out temperature (Błąd: Nie znaleziono źródła odwołania).

If for any reason (e.g. self firing up) the temperature of a put-out boiler exceeds the preset put-out temperature (Błąd: Nie znaleziono źródła odwołania), the controller will automatically

resume normal operation i.e. pumps will not be turned OFF.

## 10 FUELING

The fan should be turned OFF for the time the boiler furnace is loaded with new fuel. To this end turn the controller knob all the way to the left while the controller is in its normal operation mode (flame icon visible on the display), then press the knob and hold it down until the flame icon disappears. Fan icon starts to blink alternately with a hand icon – it means that the fan was manually disengaged (all other algorithms are operating normally).

Proceed as above to turn the fan ON. Once the fan is back ON, the controller initiates the firing up cycle – it turns the pump OFF in order to fire the new batch of fuel up as soon as possible. Should the flame to extinct, the controller will automatically turn the fan OFF.

**ATTENTION: The controller will not automatically turn the fan OFF if it was earlier manually turned OFF by the user and not turned back ON.**

## 11 CONTROLLER OPERATION

The controller attempts to maintain boiler temperature adjusting amount of air blown to the furnace by the fan and turning the CH pump ON/OFF.

Cold boiler may sweat during the firing-up period. Therefore the fan is operating at the highest power level (preset Błąd: Nie znaleziono źródła odwołania) and the pump is OFF to shorten that period as far as possible.

As soon as the boiler temperature has approached the preset (and is within the hysteresis corridor), the controller starts to smoothly control air flow adjusting the fan power level. Fan power range is limited by the minimum fan power (Błąd: Nie znaleziono źródła odwołania) and the maximum fan power (Błąd: Nie znaleziono źródła odwołania) presets.

Should the boiler temperature to exceed the upper threshold, the controller will start the boiler blowdown cycling. In that mode the fan is used only to remove combustion gases out of the furnace. Blowdown cycle parameters should be set so that boiler temperature will drop down to the level at which the controller will be able to resume linear control of the fan power.

Should the boiler temperature to exceed the alarm temperature, the fan will be turned OFF for good. Overheating is signaled by pulsing of the controller display.

Should the boiler temperature to drop down below the put-out preset (Błąd: Nie znaleziono źródła odwołania), the fan will be turned OFF. The pumps will be operated normally.

The CH pump is engaged as soon as boiler temperature  $T_{\text{boiler}}$  exceeds boiler preset temperature  $T_{\text{preset}}$  by more than half of hysteresis  $H_{\text{pump}}$ :

$$T_{\text{boiler}} > T_{\text{preset}} + H_{\text{pump}}/2$$

The pump is disengaged as soon as the temperature drops down below the preset by more than half of the hysteresis:

$$T_{\text{boiler}} < T_{\text{preset}} - H_{\text{pump}}/2$$

## 12 THE ANTY-STOP FUNCTION

The ANTY-STOP function turns on the pump immediately after the controller is turned on, then every 14 days. "AS" letters are blinking on the controller display while the function is active.

Any alarm generated while the ANTY-STOP function is active (overheating or temperature sensor failure) aborts the function execution.

## 13 TROUBLESHOOTING

### a) Device is dead

Burnt mains fuse or ROM failure. Replace the fuse or have the controller serviced.

### b) Sensor icon on the display blinks, "Sh" or "OP" letters next to the icon

Sensor circuit shorted (Sh) or opened (OP). Check/replace the sensor cable or ship the controller (together with the sensor) to service.

**c) Pump or fan does not operate**

Turn on the controller and make sure that pump/fan icons are displayed. If so, check pump/fan connections. Check if the fan was not turned OFF manually, see section 10. Check presets or restore factory ones (see section Błąd: Nie znaleziono źródła odwołania)

**d) Fan is operating continually**

Blowdown gap (Błąd: Nie znaleziono źródła odwołania) set to 0 – correct the preset.

**e) Boiler is overheating**

Blowdown time (5) too long or blowdown gap (6) too short – correct the preset.

A too large fan power level (3, 4) – correct the presets. Throttle down the fan.

**f) Controller emits a buzzing sound**

Loose coils in interference filter. The symptom does not impact correct operation in any way.

**g) Controller knob operates erratically**

Pulse generator failure. Have the controller serviced.

**14 COMPATIBILITY WITH STANDARDS/CERTIFICATES**

The **EUROSTER 11W** controller meets all requirements of the EMC and the LVD EU Directives. The CE Conformity Declaration is available on the <http://www.euroster.com.pl> Internet webpage.

**15 SPECIFICATIONS**

a) Mains	230 V 50Hz
b) Current consumption	max. 7 mA (1.6 W)
c) Fan output rated load	0.5 A (fan power < 100 VA)
d) Pump output rated load	2 A
e) Length of cables	1.5 m
f) Dimensions (width x height x depth)	150 x 90 x 54 mm

**We recommend to use a fan equipped with a reactive power compensation circuit, e.g. type WBS manufactured by Konwektor.**

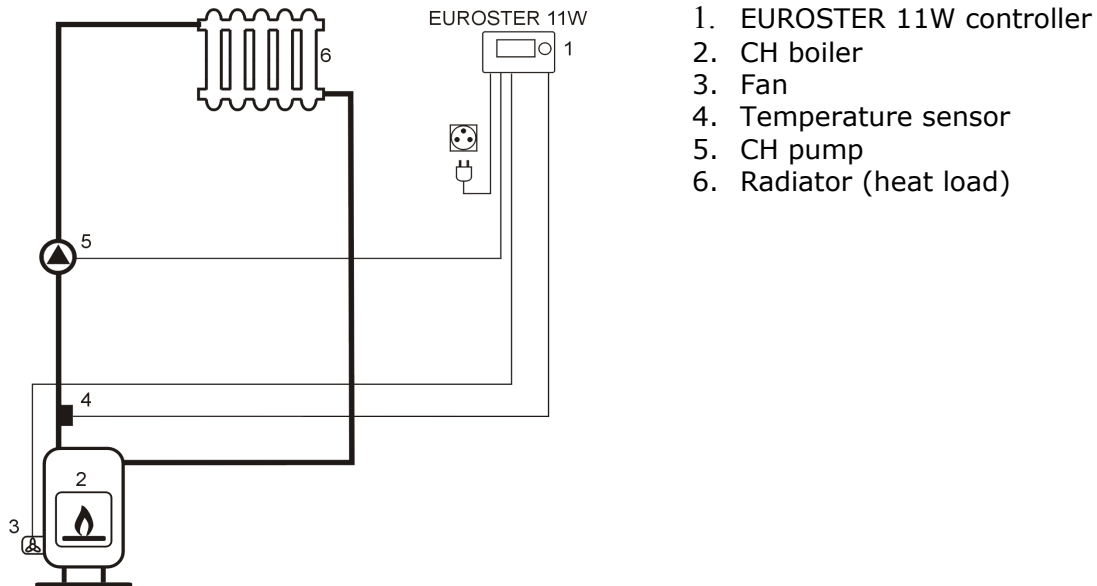
**16 KIT CONTENTS**

- a) controller box with temperature sensor
- b) sensor hose clip
- c) box fasteners/anchors
- d) this Installation & Operation Manual
- e) template to drill holes for fasteners/anchors

## 17 CONNECTION DIAGRAM

Diagram presented below is simplified (not every element necessary to correctly operate the system is shown).

### Central heating pump control mode



## 18 ELECTRONIC WASTE MANAGEMENT INFORMATION



We made every effort to get as a long controller lifetime as possible. However, the device is subject to natural tear and wear. We ask you to have a controller that will not meet your requirements any more brought in to an electronic waste management facility. Electronic waste is collected free of charge by local distributors of electronic equipment.

Inappropriate management of electronic waste may lead to an unnecessary environment pollution.

Cardboard boxes should be disposed of at a paper recycling facility.



## EUROSTER 11W CONTROLLER WARRANTY CERTIFICATE

Warranty terms:

1. Warranty is valid for 24 months from the controller sale date.
2. Warranty is valid exclusively on the territory of Poland.
3. Claimed controller together with this warranty certificate must be supplied to the seller or directly mailed via *Poczta Polska* mail operator to the manufacturer.
4. Warranty claims shall be processed within 14 business days from the date the manufacturer has received the claimed device.
5. Controller may be repaired exclusively by the manufacturer or by other party clearly authorized by the manufacturer.
6. Warranty becomes invalidated in case of any mechanical damage, incorrect operation and/or making any repairs by unauthorized persons.
7. This consumer warranty does not exclude, restrict nor suspend any right of the Buyer ensuing if the product would not meet any of the sale contract terms.

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sale date	serial number/date of manufacture	signature/stamp
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Service phone (48) 655-71-20-12

Business entity that issued this warranty certificate:

P.H.P.U. AS Agnieszka Szymańska-Kaczyńska, Chumiętki 4, 63-840 Krobia, Poland